

the male sex appearing before the female, in proportion as the species degenerates by sexual reproduction.

The spores proceeding from the fecundation of the oospheres by the antherozoids fall to the bottom of the water, and remain in a stationary condition for a considerable time. Cohn, who has lately published an important memoir* on the monœcious *Volvox globator*, thinks that these spores need to be dried before germinating, but he was unable to observe this germination. Cienkowski has seen the contents of the spore divide, and he thinks that each sphere of segmentation ultimately becomes a cœnobium.

I was fortunate enough at the beginning of June to trace the development of the spores of the species of *Volvox* which I had previously studied. I have ascertained that, contrary to Cohn's opinion, the spores of *Volvox* pass the winter in the water. In fact those which I observed were collected in the mud of a tolerably deep basin in the Jardin des Plantes which was constantly filled with water.

These spores, of an orange-yellow colour, possess two enveloping membranes—an exospore with double outline and a delicate endospore. At the moment of germination the exospore is ruptured, and the swelled endospore is seen to project through the torn place. At the same time the contents of the spore, separated from the endospore by a clear space, divide into two equal parts, which, by successive bipartitions, give origin to four, eight, sixteen, &c. small cells. The cells, which are at first orange-yellow, acquire a brown tint, becoming more and more greenish in proportion as the work of division advances. When the segmentation of the spore is completed, the cells form a spherical layer analogous to the blastoderm of a holoblastic ovum. Each element afterwards acquires two vibratile cilia. The endospore disappears, and the young *Volvox*, thus constituted, moves freely in the water. The cells, which are at first very close together, separate from each other by the intervention of a gelatinous substance.

An interesting fact is the presence, among the vegetative cells of the *Volvox* while still contained in the endospore, of elements larger than the others, which will subsequently give origin to the daughter colonies by a mode of division analogous to that observed in the spore.

The spores of *Volvox* therefore germinate in water, and each of them produces a single colony by an operation of segmentation identical with that which gives origin to a daughter colony at the expense of a cell of the mother colony.—*Bull. Soc. Philomath. Paris*, July 27, 1878.

On the Anatomy of the Larva of Eristalis tenax. By Dr. BATELLI.

Dr. Batelli has communicated to the Tuscan Society of Natural Sciences a memoir on the structure of the well-known "rat-tailed" larva of *Eristalis tenax*. He regards the external tube of the tail

* Beiträge zur Biologie der Pflanzen, 1875.

as a modified segment of the body, its nature being indicated by the existence on each side of it of a mamilla and two very long hairs, characters which are repeated upon every segment. He describes the structure of the tail, indicating how the outer tube bends more or less according as the internal tube is more or less retracted. The retraction of the internal tube is due to two muscles inserted at its superior extremity; and at this extremity there are, moreover, some gigantic cells with large nuclei having in the interior as a product of elaboration a long twisted filament. Connected with the two tracheal ramifications there are in the body two sacs, almost equal to it in length, formed of an external structureless membrane and containing small free globules. These globules on analysis prove to consist principally of earthy carbonates (carbonates of lime and magnesia).

The digestive apparatus has in its vestibule two chitinous plates. In the pharyngeal bulb there are, besides the two jaws, eight very peculiar beards (*fanoni*) consisting of two series of divaricated barbules. The salivary glands, which open beneath the inferior anastomosis of the jaws, have in their excretory tube a chitinous *interna* with a spiral thread, just as in the interior of the tracheæ and of a portion of the silk-glands of the Lepidoptera. The "valvular apparatus" of Plateau, or (better) the *gizzard*, leaves a closed peripheral space where there is an endothelium; the middle intestine or chylic stomach, which is very long, is preceded by four ventricular glands, accompanied by four Malpighian tubes. These, which discharge by four distinct orifices, unite in pairs to form an upper and a lower loop. The anal glands, which contain a great quantity of urates, are composed each of a straight part and another which is folded back; they present a muscular ligament which straightens them when they are drawn outwards.

Besides the supra- and subœsophageal ganglia the nervous system includes two intermediate ones, which, by means of a peduncle inserted into the lateral commissure, fit in between the two, especially in the antero-superior zone. A sympathetic system starts from the lower surface of the anterior extremity of the nervous chain. The thoracic and abdominal ganglia are united into a band, which immediately follows the central system above described. Small cells exist in the intermediate, and large ones in the supra-œsophageal and subœsophageal ganglia; these are few in the former, but very numerous in the latter.

The tracheal tubes have in their anterior stigma, besides a solid terminal sheath, an involucrem lined internally with an endothelium, and containing very large cells, in the same way as above described for the tail, interposed between the involucrem in question and the tube of the trachea.—*Soc. Tosc. di Scienze Nat., Proc. Verb.*, Nov. 10, 1878.

On the Dentition of Smilodon. By M. P. GERVAIS.

The *Smilodontes* are great Felidæ found fossil in the caves and in the deposits of the Pampas of South America (Brazil and the